

# A Proposal for Global R&D Collaboration on Nb surfaces, Films and New Materials for SRF Cavities

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# Background

- To our knowledge, there is no single place online for discussions focusing on these issues. (There are some individual collaboration web pages, but not disseminated to larger audience.)
- Now that the ILC will use SRF technology, successful and timely R&Ds will significantly benefit the ILC project in addition to other projects that will use SRF.

# Goals

- Expedite the R&Ds that will have significant impact on the SRF technology.
- Involve more academic institutes such as universities
- Improve communications among worldwide researchers working on these topics
- Increase funds invested on these R&Ds
- Generate useful outcomes in a timely manner

# How do we achieve the goals?

- Through a dedicated web site and frequent electronic newsletters, bring new participants up to speed quickly
- By rapidly disseminating new R&D results, encourage participants to discuss and/or cross check them, and eliminate redundant R&Ds.
- Organize meetings, video conferences and topical workshops for in-depth discussions.

# Proposed structure of this global collaboration

- Board: Collects funds, make decisions on their distribution. This consists of SRF community leaders and people who are well connected to potential funding sources.
- Coordination Committee (CC): Administrative arm of the Board, i.e., make proposals, manage funds, organize meetings, etc., tentatively we, Pierre, Tsuyoshi and Anne-Marie will serve as this, but as things move forward, more people will need to be added from different regions.

# Coordination Committee (CC)

- We divided our responsibilities into 3 regions
  - Pierre Bauer: USA
  - Tsuyoshi Tajima: Asia/Pacific
  - Anne-Marie Valente: Europe
- The person in charge of each region will contact people from corresponding region
- We will start monthly video meetings from December 2004.


# CC current activities

- Disseminating the idea of this collaboration and asking people who may get interested
- Creating a web site
- Creating a generic Memorandum of Understanding (MoU) for individual collaborations
- Making emailing lists for general and individual R&D participants

# Web Page (Draft): [http://laacg.lanl.gov/laacg/srf\\_rd/](http://laacg.lanl.gov/laacg/srf_rd/)

Superconducting RF R&D - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

 [http://laacg.lanl.gov/laacg/srf\\_rd/](http://laacg.lanl.gov/laacg/srf_rd/)


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## SRF R&D

Superconducting RF R&D  
Nb Films, New Materials

<a href="#">Organizers</a>	<a href="#">Home</a>	<a href="#">Topics</a>
<a href="#">Experiments</a>	<a href="#">Participants</a>	<a href="#">Objectives</a>
	<a href="#">Publications</a>	<a href="#">Status</a>
		<a href="#">Mailing List</a>
		<a href="#">Site Index</a>

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## Superconducting RF R&D

Website on a global collaboration on research and development related to superconducting RF. The purpose of this site is to facilitate the interaction among the collaborators and the dissemination of information on work done at universities, research centers and in industry. Research topics include work on niobium films, new materials, ....

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Collaborating Institutions:

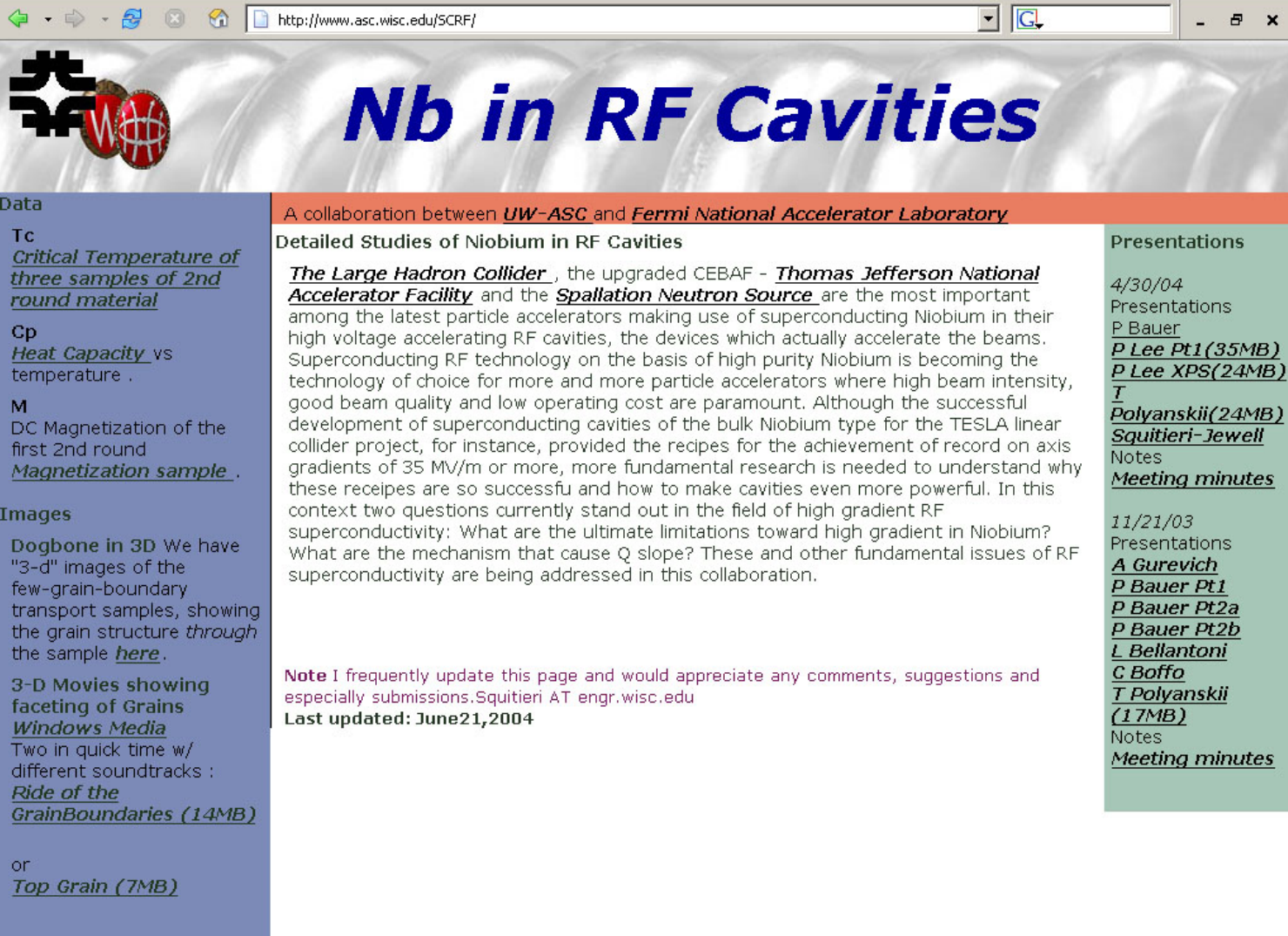
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# An example of high quality collaboration

## FNAL and U. Wisconsin Collaboration Web Page



<http://www.asc.wisc.edu/SCRF/>

## Nb in RF Cavities

A collaboration between *UW-ASC* and *Fermi National Accelerator Laboratory*

### Data

**Tc**  
[Critical Temperature of three samples of 2nd round material](#)

**Cp**  
[Heat Capacity](#) vs temperature .

**M**  
DC Magnetization of the first 2nd round  
[Magnetization sample](#) .

### Images

**Dogbone in 3D** We have "3-d" images of the few-grain-boundary transport samples, showing the grain structure *through* the sample [here](#) .

**3-D Movies showing faceting of Grains**  
[Windows Media](#)  
Two in quick time w/ different soundtracks :  
[Ride of the GrainBoundaries \(14MB\)](#)

or  
[Top Grain \(7MB\)](#)

### Detailed Studies of Niobium in RF Cavities

*The Large Hadron Collider* , the upgraded CERN - *Thomas Jefferson National Accelerator Facility* and the *Spallation Neutron Source* are the most important among the latest particle accelerators making use of superconducting Niobium in their high voltage accelerating RF cavities, the devices which actually accelerate the beams. Superconducting RF technology on the basis of high purity Niobium is becoming the technology of choice for more and more particle accelerators where high beam intensity, good beam quality and low operating cost are paramount. Although the successful development of superconducting cavities of the bulk Niobium type for the TESLA linear collider project, for instance, provided the recipes for the achievement of record on axis gradients of 35 MV/m or more, more fundamental research is needed to understand why these recipes are so successful and how to make cavities even more powerful. In this context two questions currently stand out in the field of high gradient RF superconductivity: What are the ultimate limitations toward high gradient in Niobium? What are the mechanism that cause Q slope? These and other fundamental issues of RF superconductivity are being addressed in this collaboration.

**Note** I frequently update this page and would appreciate any comments, suggestions and especially submissions. [Squitieri AT engr.wisc.edu](mailto:Squitieri AT engr.wisc.edu)  
**Last updated: June 21, 2004**

### Presentations

4/30/04  
Presentations  
P Bauer  
[P Lee Pt1 \(35MB\)](#)  
[P Lee XPS \(24MB\)](#)  
T  
[Polyanskii \(24MB\)](#)  
[Squitieri-Jewell](#)  
Notes  
[Meeting minutes](#)

11/21/03  
Presentations  
[A Gurevich](#)  
[P Bauer Pt1](#)  
[P Bauer Pt2a](#)  
[P Bauer Pt2b](#)  
[L Bellantoni](#)  
[C Boffo](#)  
[T Polyanskii \(17MB\)](#)  
Notes  
[Meeting minutes](#)

# What about other R&Ds?

- Tsuyoshi's personal opinion
  - Better to be included in one web site, but needs more volunteers who will be in charge of those topics, e.g., industrialization, Nb/Cu clad cavities, material control, etc.

You will be asked soon via email whether you want to participate in this or not, if you want to volunteer to be in the Coordination Committee or the Board.